

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
15 February 2001 (15.02.2001)

PCT

(10) International Publication Number  
WO 01/10901 A3

(51) International Patent Classification<sup>7</sup>: A61K 38/17,  
39/39, A61P 31/00

Vine Streets, Philadelphia, PA 19102 (US). ZEPPEZA-  
UER, Michael [DE/DE]: Auf den Hütten 32, D-66133  
Scheidt/Saarbrücken (DE).

(21) International Application Number: PCT/US00/21747

(22) International Filing Date: 9 August 2000 (09.08.2000)

(74) Agents: COLBY, Gary, D.; Akin, Gump, Strauss, Hauer  
& Feld, L.L.P., One Commerce Square, Suite 2200, 2005  
Market Street, Philadelphia, PA 19103 et al. (US).

(25) Filing Language: English

(81) Designated States (*national*): CA, JP, US.

(26) Publication Language: English

(84) Designated States (*regional*): European patent (AT, BE,  
CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC,  
NL, PT, SE).

(30) Priority Data:  
09/372,500 11 August 1999 (11.08.1999) US

(71) Applicants (*for all designated States except US*): SYM-  
BIOTEC GMBH [DE/DE]; Im Stadtwald 6, D-66123  
Saarbrücken (DE). PHILADELPHIA HEALTH AND  
EDUCATION CORPORATION [US/US]; Broad &  
Vine Streets, Philadelphia, PA 19102 (US).

Published:

— with international search report

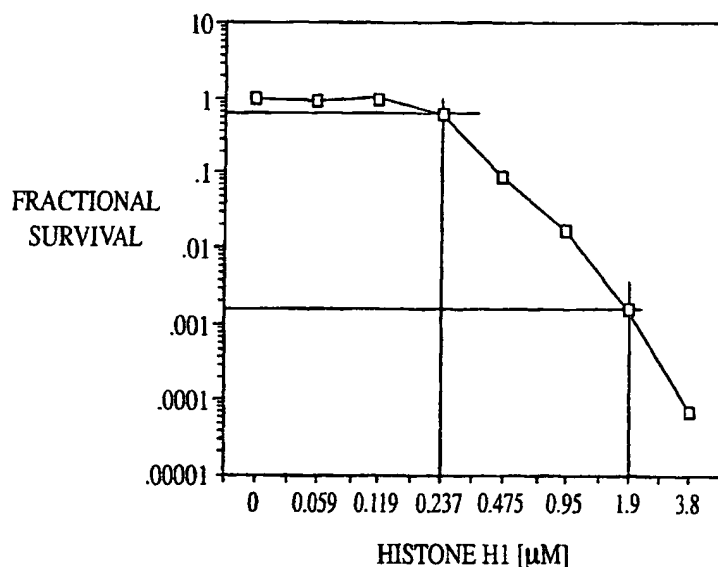
(88) Date of publication of the international search report:  
9 August 2001

(72) Inventors; and

(75) Inventors/Applicants (*for US only*): CLASS, Reiner  
[DE/US]; Hahnemann University Hospital, Broad &

*For two-letter codes and other abbreviations, refer to the "Guid-  
ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.*

(54) Title: ANTIMICROBIAL HISTONE H1 COMPOSITIONS, KITS, AND METHODS OF USE THEREOF



(57) Abstract: The invention includes antibiotic pharmaceutical compositions comprising eukaryotic histone H1 protein and methods of using eukaryotic histone H1 protein to kill or to inhibit the growth of microorganisms, including, but not limited to, human pathogenic bacteria. The invention further includes a eukaryotic histone H1-containing animal feed and methods of improving growth of an animal by supplying the feed to the animal. The invention still further includes a kit comprising a eukaryotic histone H1-containing antibiotic pharmaceutical composition and an instructional material which describes the use of the composition. In addition, the invention includes a vaccine comprising a eukaryotic histone H1 protein and a method of vaccinating an animal using the vaccine.



WO 01/10901 A3

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/21747

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A61K38/17 A61K39/39 A61P31/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A61K C07K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, CHEM ABS Data, EMBASE, BIOSIS, MEDLINE, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99 37318 A (SAMYANG GENEX CORPORATION) 29 July 1999 (1999-07-29) claims 1-5 ---	1,2,5,7
X	DE 197 15 149 A (SYMBIOTEC ...) 15 October 1998 (1998-10-15) claims 1-24 ---	1-3,5,7
X	US 5 780 432 A (M. ZEPPEAUER ET AL) 14 July 1998 (1998-07-14) claims 1-4 ---	1,2,5,7
X	WO 97 38713 A (THE REGENTS OF THE UNIVERSITY OF CALIFORNIA ET AL) 23 October 1997 (1997-10-23) claims 26-31 --- -/--	1,2,5,7

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## \* Special categories of cited documents:

\*A\* document defining the general state of the art which is not considered to be of particular relevance

\*E\* earlier document but published on or after the international filing date

\*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

\*O\* document referring to an oral disclosure, use, exhibition or other means

\*P\* document published prior to the international filing date but later than the priority date claimed

\*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

\*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

\*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

\*Z\* document member of the same patent family

Date of the actual completion of the international search

23 February 2001

Date of mailing of the international search report

16/03/2001

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Siatou, E

## INTERNATIONAL SEARCH REPORT

Int'l Application No

PCT/US 00/21747

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 392 315 A (SYMBIOTEC ...) 17 October 1990 (1990-10-17) claims 1-8 ----	1,2,5-7
X	F. R. A. J. ROSE ET AL: "Potential Role of epithelial Cell-Derived Histone H1 Proteins in Innate Antimicrobial Defense in the Human Gastrointestinal Tract" INFECTION AND IMMUNITY, vol. 66, no. 7, July 1998 (1998-07), pages 3255-3263, XP002161002 abstract ----	1,2, 7-16, 24-37
X	HIRSCH J G: "BACTERICIDAL ACTION OF HISTONE" JOURNAL OF EXPERIMENTAL MEDICINE, JP, TOKYO, vol. 108, 1958, pages 925-944, XP000618018 ISSN: 0022-1007 the whole document ----	1,2, 7-16, 24-37
X	GB 563 651 A (THE TRUSTEES OF THE UNIVERSITY OF PENNSYLVANIA) 24 August 1944 (1944-08-24) claims 1-17 ----	19,20
X	DATABASE CHEMABS 'Online! CHEMICAL ABSTRACTS SERVICE, COLUMBUS, OHIO, US; AN: 76:95140, I. P. ASHMARIN ET AL: "Combined action of histones and antibacterial agents in vitro and in vivo, potentiating the Tubazid effect" XP002161003 & Dokl. Akad. Nauk SSSR (1971), 201(2), 477-9 'Microbiol! abstract ----	5
X	DATABASE CHEMABS 'Online! CHEMICAL ABSTRACTS SERVICE, COLUMBUS, OHIO, US; AN: 77:56332, I. P. ASHMARIN ET AL: "Combined effect of histones and antibiotics in vitro and in vivo. antibacterial effect of histone fractions of calf thymus in combination with streptomycin and tubazid" XP002161004 & Antibiotiki (Moscow) (1972), 17(3), 266-9 abstract -----	5

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 00/21747

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9937318 A	29-07-1999	KR 261114 B AU 2187599 A CN 1255857 T EP 0977581 A JP 2000510492 T	01-07-2000 09-08-1999 07-06-2000 09-02-2000 15-08-2000
DE 19715149 A	15-10-1998	AU 8311098 A WO 9846252 A EP 0973541 A JP 2000512311 T	11-11-1998 22-10-1998 26-01-2000 19-09-2000
US 5780432 A	14-07-1998	US 5578571 A	26-11-1996
WO 9738713 A	23-10-1997	AU 2992497 A CA 2251058 A EP 0959900 A	07-11-1997 23-10-1997 01-12-1999
EP 392315 A	17-10-1990	DE 3400928 A DE 3405620 A AT 57835 T CA 1251134 A DE 3580283 D WO 8503003 A EP 0149468 A JP 7005476 B JP 61500913 T US 5182257 A US 4818763 A	19-09-1985 05-09-1985 15-11-1990 14-03-1989 06-12-1990 18-07-1985 24-07-1985 25-01-1995 08-05-1986 26-01-1993 04-04-1989
GB 563651 A		NONE	

Second, 37 CFR 1.98(c) states that when the disclosures of two or more patents or publications listed in an information disclosure statement are substantively cumulative, a copy of one of the patents or publications may be submitted without copies of the other patents or publications provided that a statement is made that these other patents or publications are cumulative. The examiner will then consider only the patent or publication of which a copy is submitted and will so indicate on the list, form PTO-1449, or PTO/SB/08A and 08B, submitted, e.g., by crossing out the listing of the cumulative information. But see *Semiconductor Energy Laboratory Co. v. Samsung Electronics Co.*, 204 F.3d 1368, 1374, 54 USPQ2d 1001, 1005 (Fed. Cir. 2000) (Reference was not cumulative since it contained a more complete combination of the claimed elements than any other reference before the examiner. "A withheld reference may be highly material when it discloses a more complete combination of relevant features, even if those features are before the patent examiner in other references." (citations omitted).).

37 CFR 1.98(a)(3)(ii) states that if a written English language translation of a non-English language document, or portion thereof, is within the possession, custody or control of, or is readily available to any individual designated in 37 CFR 1.56(c), a copy of the translation shall accompany the statement. Translations are not required to be filed unless they have been reduced to writing and are actually translations of what is contained in the non-English language information. If no translation is submitted, the examiner will consider the information in view of the concise explanation and insofar as it is understood on its face, e.g., drawings, chemical formulas, English language abstracts, in the same manner that non-English language information in Office search files is considered by examiners in conducting searches.

### **A (3) Concise Explanation of Relevance for Non-English Language Information**

Each information disclosure statement must further include a concise explanation of the relevance, as it is presently understood by the individual designated in

37 CFR 1.56(c) most knowledgeable about the content of the information listed that is not in the English language. The concise explanation may be either separate from the specification or incorporated therein with the page(s) and lines of the specification where it is incorporated being noted in the IDS.

The requirement for a concise explanation of relevance is limited to information that is not in the English language. The explanation required is limited to the relevance as understood by the individual designated in 37 CFR 1.56(c) most knowledgeable about the content of the information at the time the information is submitted to the Office. If a complete translation of the information into English is submitted with the non-English language information, no concise explanation is required. An English-language equivalent application may be submitted to fulfill this requirement if it is, in fact, a translation of a foreign language application being listed in an information disclosure statement. There is no requirement for the translation to be verified. Submission of an English language abstract of a reference may fulfill the requirement for a concise explanation. Where the information listed is not in the English language, but was cited in a search report or other action by a foreign patent office in a counterpart foreign application, the requirement for a concise explanation of relevance can be satisfied by submitting an English-language version of the search report or action which indicates the degree of relevance found by the foreign office. This may be an explanation of which portion of the reference is particularly relevant, to which claims it applies, or merely an "X", "Y", or "A" indication on a search report. The requirement for a concise explanation of non-English language information would not be satisfied by a statement that a reference was cited in the prosecution of a United States application which is not relied on under 35 U.S.C. 120.

If information cited or submitted in a prior application relied on under 35 U.S.C. 120 was not in English, a concise explanation of the relevance of the information to the new application is not required unless the relevance of the information differs from its relevance as explained in the prior application.



Images Description and Claims (94 Kb)

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT  
COOPERATION TREATY (PCT)

(11) WO 98/46252

(13) A1

(21) PCT/EP98/02112

(22) 09 April 1998 (09.04.1998)

(25) German

(26) German

(30) 197 15 149.3

11 April 1997  
(11.04.1997)

DE

(43) 22 October 1998 (22.10.1998)

(51)<sup>6</sup> A61K 38/16, G01N 33/574 // (C07K 14/705)

(54) THERAPEUTIC, PROPHYLACTIC AND DIAGNOSTIC AGENT FOR  
CANCER, USEFUL FOR CHARACTERISING CANCER CELLS WITH  
INDIVIDUAL PROPERTIES

(71) SYMBIOTEC GESELLSCHAFT ZUR FORSCHUNG UND  
ENTWICKLUNG AUF DEM GEBIET DER BIOTECHNOLOGIE MBH  
[DE/DE]; Auf den Luppen 8, D-35745 Herborn-Hörbach (DE).

(72) ZEPPEZAUER, Michael [DE/DE]; Auf den Hütten 32, D-66133 Scheidt (DE).

(75) LEINENBACH, Hans-Peter [DE/DE]; Mauritiusweg 1, D-66636 Tholey  
(DE). CLASS, Reiner [DE/US]; 53-7 Revere Road, Drexel Hill, PA 19026  
(US). FASSBENDER, Cordula [DE/DE]; Ehrenfeldgürtel 165, D-50823 Köln  
(DE).

(74) PÄTZOLD, Herbert; Steubstrasse 10, D-82166 Gräfelfing (DE).

(81) AU, BG, BR, CA, CN, CZ, EE, GE, HU, IL, JP, KR, MX, NO, NZ, PL, RU,  
SK, TR, UA, US

(84) Eurasian patent (AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT,  
BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE)

**Published**

-- with international search report

-- before the expiration of the time limit for amending the claims and to be  
republished in the event of receipt of amendments

(57) A therapeutic or prophylactic agent for cancer is disclosed which damages the membrane and kills cancer cells, in particular of the blood-forming system, having membrane protein aggregates which contain several core histones or largely core-like histones and/or their parts. The therapeutic or prophylactic agent contains at least one pure histone or its active sequence section selected from the group composed of histone H1, H1 subtypes, H2A, H2B, H2A:H2B dimer, H3 and H4, covalent modified histones of the above-mentioned type and/or their active sections and functionally

and structurally similar proteins (protamines, histone-like proteins of prokaryotic and archae bacteria).



1 of 1